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***IN THE UNITED STATES PATENT AND TRADEMARK OFFICE***

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In re application of: Randy E. Keen

Attorney Docket No.: KEENP001X1C1

Application No.: NEW

Examiner: UNASSIGNED

Filed: HEREWITH

Group: UNASSIGNED

Title: MOLECULAR WIRE INJECTION  
SENSORS

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**INFORMATION DISCLOSURE STATEMENT  
37 CFR §§1.56 AND 1.97(b)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

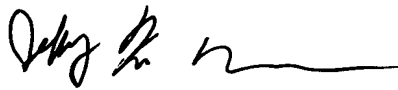
Dear Sir:

The references listed in the attached PTO Form 1449 may be material to examination of the above-identified patent application. Applicants submit the list of these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application. The above-identified application is a Continuation of prior application U.S. Patent Application No. 09/960,165. This prior application is being relied upon for an earlier filing date under 35 U.S.C. § 120. Because the listed references were either cited by the PTO, or submitted to the PTO in the prior application, under 37 CFR § 1.98(d) Applicants submit that copies need not be provided.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

This Information Disclosure Statement is: (i) filed within three (3) months of the filing date of the above-referenced application, (ii) believed to be filed before the mailing date of a first Office Action on the merits, or (iii) believed to be filed before the mailing of a first Office Action after the filing of a Request for Continued Examination under §1.114. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. KEENP001X1C1).

Respectfully submitted,  
BEYER WEAVER & THOMAS, LLP



Jeffrey K. Weaver  
Registration No. 31,314

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<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No. KEENP001X1C1	Serial No.: NEW
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#### U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A	5,431,883	07/11/95	Barraud	422	82.01	01/27/94
	B	4,777,019	10/11/88	Dandekar	422	68	04/11/86
	C	5,403,700	04/04/95	Heller, et al.	430	311	01/22/92
	D	5,401,376	03/28/95	Foos, et al.	204	415	03/11/94
	E	5,385,651	01/31/95	Stickney, et al.	204	109.25	05/28/93
	F	5,356,757	10/18/94	Shionoya, et al.	430	315	11/06/92
	G	5,320,736	06/14/94	Stickney, et al.	205	157	05/06/91
	H	5,309,085	05/03/94	Sohn	324	71.5	11/24/92
	I	5,262,035	11/16/93	Gregg, et al.	204	403	08/02/89
	J	5,250,168	10/05/93	Tsukada, et al.	204	416	07/01/91
	K	5,243,516	09/07/93	White	364	413.07	12/15/89

#### Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	L	0228259B1	02/17/93	EPO	C12N	11/08	X	
	M	0395137B1	08/16/95	EPO	G01N	33/543	X	
	N	0230472B1	06/19/86	EPO	G01N	27/416	X	
	O	WO 93/08464	04/29/93	PCT	G01N	27/26	X	
	P	WO 94/28203	12/08/94	PCT	C25F	3/12	X	

#### Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	R	Heller, A: "Electrical Wiring of Redox Enzymes." <u>Acc. Chem. Res.</u> 23(5):128-134, 1990.
	S	Khan, GF; Shinohara, H; Ikariyama, y; Aizawa, M: "Electrochemical Behaviour of Monolayer Quinoprotein Adsorbed on the Electrode Surface," <u>J. Electroanal Chem.</u> 315:263-273, 1991
	T	Shinohara, H; Khan, GF; Ikariyama, Y; Aizawa, M: "Electrochemical Oxidation and Reduction of PQQ Using a Conducting Polypyrrole-Coated Electrode," <u>J. Electroanal. Chem.</u> 304:75-84, 1991.
Examiner		Date Considered

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	2A	5,215,631	06/01/93	Westfall	204	64	10/11/91
	2B	5,212,050	05/18/93	Mier, et al.	430	320	08/15/90
	2C	5,200,051	04/06/93	Cozzette, et al.	204	403	11/07/89
	2D	5,166,063	11/24/92	Johnson	435	173	06/29/90
	2E	5,140,393	08/18/92	Hijikihigawa, et al.	357	25	09/05/90
	2F	5,126,921	06/30/92	Fujishima, et al.	361	525	06/30/92
	2G	5,112,455	05/12/92	Cozzette, et al.	204	153.12	07/20/90
	2H	5,108,819	04/28/92	Heller, et al.	428	195	02/14/90
	2I	5,063,081	11/05/91	Cozzette, et al.	427	2	08/15/90
	2J	5,034,192	07/23/91	Wrighton, et al.	422	82.02	06/21/89
	2K	5,000,180	03/19/91	Kuypers, et al.	128	635	07/31/89

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							Yes	No
	2L							
	2M							
	2N							
	2O							
	2P							

#### Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	2R	Schuhmann, W; Ohara, TJ; Schmidt, H-L; Heller, A: "Electron Transfer between Glucose Oxidase and Electrodes via Redox Mediators Bound with Flexible Chains to the Enzyme Surface," <u>J. Am. Chem. Soc.</u> 113(4):1394-1397, 1991.
	2S	Gregg, BA; Heller, A: "Cross-Linked Redox Gels Containing Glucose Oxidase for Amperometric Biosensor Applications," <u>Anal Chem.</u> 62(3):258-263, 1990.
	2T	Heller, A: "Electrical Connection of Enzyme Redox Centers to Electrodes," <u>J. Phys. Chem.</u> 96(9):3579-3587, 1992.
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	3A	4,963,815	10/16/90	Hafeman	324	715	02/10/87
	3B	4,942,127	07/17/90	Wada, et al.	435	11	05/06/88
	3C	4,936,956	06/26/90	Wrighton	204	153.21	10/29/87
	3D	4,929,313	05/29/90	Wrighton	204	153.1	01/04/88
	3E	4,909,921	03/20/90	Ito	204	403	02/09/89
	3F	4,895,705	01/23/90	Wrighton	422	68	05/13/87
	3G	4,894,339	12/17/86	Hanazato, et al.	435	182	12/17/86
	3H	4,889,612	12/26/89	Geist, et al.	204	416	05/22/87
	3I	4,874,500	10/17/89	Madou, et al.	204	412	07/15/87
	3J	4,839,000	06/13/89	Eddowes	204	1	11/21/86
	3K	4,764,797	08/16/88	Shaw, et al.	357	25	07/08/86

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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	3R	Schuhmann, W: "Diagnostic Biosensor Polymers," ACS Symposium Series 556. Usmani, AM; Akmal, N; eds. <u>American Chemical Society</u> ; Washington, D.C.; 1994; pp. 110-123.
	3S	Heller, A: "Electrical Wiring of Redox Enzymes," <u>Acc. Chem. Res.</u> 23(5):128-134, 1990.
	3T	Wrotnowski, Cort, "Biosensors are Making Steady Yet Limited Progress into the Marketplace," 11-15-96, <u>Genetic Engineering News</u> .
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	4A	4,721,601	01/26/88	Wrighton, et al.	422	68	11/23/84
	4B	4,717,673	01/05/88	Wrighton, et al.	436	68	11/19/85
	4C	4,711,245	12/08/87	Higgins, et al.	128	635	05/07/84
	4D	4,591,550	05/27/86	Hafeman, et al.	435	4	04/05/84
	4E	4,545,382	10/08/85	Higgins, et al.	128	635	10/22/82
	4F	4,502,938	03/05/85	Covington, et al.	204	412	04/08/82
	4G	4,442,185	04/10/84	Skotheim	429	111	06/09/82
	4H	4,416,959	11/22/83	Skotheim	429	111	10/19/81
	4I	4,354,308	10/19/82	Shimada, et al.	29	571	02/05/80
	4J	4,225,410	09/30/80	Pace	204	195	12/04/78
	4K	4,218,298	08/19/80	Shimada, et al.	204	195	11/03/78

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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	4R	Dagani, Ron, "Single molecular wire shown to be conductive," 3-15-96, <u>C&amp;EN</u> .
	4S	Gregg, BA: Heller, "A:Redox Polymer Films Containing Enzymes.1. A Redox-Conducting Epoxy Cement: Synthesis, Characterization, and Electrocatalytic Oxidation of Hydroquinone." <u>J Phys. Chem.</u> 95:5970-5975, 1991.
	4T	Hale, PD et al. "A New Class of Amperometric Biosensor Incorporating a Polymeric Electron-Transfer Mediator." <u>J. Am. Chem. Soc.</u> 111(9): 3482-3484, 1989.
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	5A	5,543,326	08/06/96	Heller, et al.	435	287.9	03/04/94
	5B	4,180,771	12/25/79	Guckel	324	71	12/02/77
	5C	4,562,157	12/31/85	Lowe, et al.	435	291	05/25/84
	5D	4,713,347	12/15/87	Mitchell, et al.	436	501	01/14/85
	5E	4,886,625	12/12/89	Albarella, et al.	252	500	10/29/87
	5F	4,916,075	04/10/90	Malmros, et al.	435	291	08/19/87
	5G	5,156,810	10/20/92	Ribi	422	82.01	06/15/89
	5H	5,202,261	04/13/93	Musho, et al.	435	288	11/18/91
	5I	5,320,725	06/14/94	Gregg, et al.	204	153.12	05/08/92
	5J	5,403,451	04/04/95	Riviello, et al.	204	153.1	03/04/94
	5K	5,422,246	06/06/95	Koopal, et al.	435	14	12/13/91

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	5O							
	5P							

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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	5R	Cass, AEG, et al. "Ferrocene-Mediated Enzyme Electrode for Amperometric Determination of Glucose," <u>Anal. Chem.</u> 56:667-671, 1984.
	5S	Kober, EM, et al. "Synthetic Routes to New Polypyridyl Complexes of Osmium (II)," <u>Inorg. Chem.</u> 27: 4587-4598, 1988.
	5T	Boguslavsky, LI et al. "Novel Biosensors for Specific Neurotransmitters Based on Flavoenzymes and Flexible Redox Polymers," <u>Polym. Mater. Sci. Eng.</u> 64:322-323, 1991.
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	6A	5,491,097	02/13/96	Ribi, et al.	436	518	02/28/94
	6B	5,532,128	07/02/96	Eggers, et al.	435	16	12/12/94
	6C	5,556,524	09/17/96	Albers	204	296	02/16/95
	6D	5,556,752	09/17/96	Lockhart, et al.	435	6	10/24/94
	6E	5,561,071	10/01/96	Hollenberg, et al.	437	1	09/25/95
	6F	5,571,568	11/05/96	Ribi, et al.	427	487	06/07/95
	6G	5,622,872	04/22/97	Ribi	436	518	05/11/95
	6H	5,534,132	07/09/96	Vreeke, et al.	205	777.5	05/04/95
	6I	5,320,725	06/14/94	Gregg, et al.	204	153.12	05/08/92
	6J	5,591,578	01/07/97	Meade, et al.	435	6	12/10/93
	6K	5,593,852	1/14/97	Heller	435	14	09/01/94

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	6M							
	6N							
	6O							
	6P							

#### Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
	6R	Marcus, RA, et al. "Electron Transfers In Chemistry and Biology Biochim," <u>Biophys. Acta</u> 811:265-322, 1985.
	6S	Abstract. KAMR Proprietary. "Superconducting Quantum Wire Injection Device - A Novel Molecular Transistor," <u>US Patent Application</u> . KAMR Proprietary. 1-37. December 01, 1991.
	6T	Aizawa, M. et al., "Molecular Interfacing of Enzymes on the Electrode Surface," Chapter 26. In: <u>Interfacial Design and Chemical Sensing</u> . ACS Symposium Series 561. Mallouk, TE; Harrison, DJ ; eds. <u>American Chemical Society</u> , Washington, D. C.: 305-314, 1994.
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	7A	5,252,743	10/12/93	Barrett et al.	548	303.7	11/31/90
	7B	5,670,322	09/23/97	Eggers et al.	435	6	06/01/95
	7C						
	7D						
	7E						
	7F						
	7G						
	7H						
	7I						
	7J						
	7K						

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	7M							
	7N							
	7O							
	7P							

### Other Documents

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	7R	Boehringer, et al., "Electron-Transport Rates in an Enzyme Electrode for Glucose," ACS Symposium Series, <u>American Chemical Society</u> , Washington, D.C., 1994, pp. 47-306.
	7S	Collings, PJ: Chap. 9. "Polymer Liquid Crystals," In: Liquid Crystals: Nature's Delicate Phase of Matter. <u>Princeton University Press</u> ; Princeton, New Jersey, 162-180; 1990.
	7T	Ladik, J; Biczo, G; Redly, J: "Possibility of Superconductive-Type Enhanced Conductivity in DNA at Room Temperature." <u>Phys. Rev.</u> 188(2):710-715, 1969.
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**Other Documents**

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	8R	Ahmed, NAG; Calderwood, JH; Frohlich, H; Smith, CW: "Evidence For Collective Magnetic Effects In An Enzyme: Likelihood Of Room Temperature Superconductive Regions," <u>Phys. Lett.</u> 53A(2):129-130, 1975.
	8S	Little, WA: "Possibility of Synthesizing an Organic Superconductor," <u>Phys. Rev.</u> 134(6A):A1416-A1424, 1964. Little, WA: "Possibility of Synthesizing an Organic Superconductor," <u>Phys. Rev.</u> 134(6A):A1416-A1424, 1964.
	8T	Kulys, JJ, et al.: "Oxidation Of Glucose Oxidase From Penicillin Vitale By One- And Two-Electron Acceptors," <u>Biochim. Biophys. Acta</u> 744:57-63, 1983.
	9R	Ikeda, T; et al. M: "Glucose Oxidase-Immobilized Benzoquinone-Carbon Paste Electrode as a Glucose Sensor," <u>Agric. Biol. Chem.</u> 49(2):541-543, 1985.
	9S	Matthews, FS;, et al.: "The Structure of Cytochrome b <sub>562</sub> from Escherichia coli at 2.5 Å Resolution," <u>J. Biol. Chem.</u> 254(5):1699-1706, 1979.
	9T	Weber, PC; et al.: "On the Evolutionary Relationship of the 4- <sub>-</sub> Helical Heme Proteins," <u>J. Biol. Chem.</u> 256(15):7702-7704, 1981.
	10R	Lambrechts, M; Sansen, W: Chap. 4. "Planar Technologies For Microelectrochemical Sensors. In: Biosensors: Microelectrochemical Devices," <u>Institute of Physics Publishing</u> , Bristol, Philadelphia, New York; 1992; pp. 98-155.
	10S	Launay, JP: "Intermolecular Electron Transfer. Applications In Molecular Electronics. In: Mixed Valency Systems: Applications In Chemistry, Physics and Biology," Prassides, K; ed. <u>Kluwer Academic Publishers</u> ; Dordrecht, Boston, London; 1991; pp. 321-328.
	10T	Pethig, R: "Electronic Properties of Biological Materials," <u>John Wiley &amp; Sons</u> , Chichester and New York, 1979.
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	11R	Carter, F., "Molecular Electronic Devices II," <u>Marcel Dekker, Inc.</u> , New York and Basel; 1987, pp. 39-53; 269-310, 573-590 and 723-739.
	11S	Stegemeyer, H; "Liquid Crystals," Steinkopff, Darmstadt and Springer, New York; 1994; Chapters 1-3.
	11T	Degani, Y; Heller A: "Direct Electrical Communication between Chemically Modified Enzymes and Metal Electrodes," 1. <u>Electron Transfer from Glucose</u> 20(1):78-81, 1979.
	12R	Miller, LL; Mann, KR: " $\pi$ - Dimers and $\pi$ -Stacks in Solution and in Conducting Polymers," <u>Acc. Chem. Res.</u> 29(9):417-423.
	12S	Herzfeld, J: "Entropically Driven Order in Crowded Solutions: From Liquid Crystals to Cell Biology," <u>Acc. Chem. Res.</u> , 1996, pages 31-37.
	12T	Stix, G: "Trends in Semiconductor Manufacturing: Toward Point One," <u>Scientific American</u> 272(2):90-95, 1995.
	13R	Arkin, MR; et al.: "Rates of DNA-Mediated Electron Transfer Between Metallointercalators," <u>Science</u> 273:475-480, 1996.
	13S	Meade, TJ and Kayyem, JF: "Electron Transfer Through DNA: Site-Specific Modification of Duplex DNA with Ruthenium Donors and Acceptors," <u>Angew. Chem. Int. Ed. Engl.</u> 34(3):352-354, 1995.
	13T	Sailor, MJ; Curtis, CL: "Conducting Polymer Connections for Molecular Devices," <u>Adv. Mater.</u> 6(9):688-692, 1994.
	14R	Kressin, AM; et al.: "Synthesis of Stoichiometric Cadmium Selenide Films via Sequential Monolayer Electrodeposition," <u>Chem. Mater.</u> 3(6):1015-1020, 1991.
	14S	Booy, FP; et al.: "Liquid-Crystalline, Phase-Like Packing Of Encapsulated DNA In Herpes Simplex Virus," <u>Cell</u> 64:1007-1015, 1991.
	14T	Flory, PJ: "Nematic Phase Equilibrium in Rigid Chain Polymers," <u>Polymer Preprints</u> 20(1):30, 1979
	15R	Iizuka, E: "Liquid Crystals of Macromolecules Including Living Systems: With Stress on Their Susceptibilities to Electromagnetic Fields," <u>Polymer Preprints</u> 20(1):78-81, 1979
	15S	Rill, RL: "Liquid Crystalline Phases in Concentrated Aqueous Solutions of Na <sup>+</sup> DNA," <u>Proc. Natl. Acad. Sci. USA</u> 83:342-346, 1986.
	15T	Brandes, R; Kearns, DR: "Magnetic Ordering of DNA Liquid Crystals," <u>Biochemistry</u> 25(20):5890-5895, 1986
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	35B	6,197,949	03/06/01	Teoule et al.			
	35C	5,922,183	07/13/99	Rauh			
	35D	6,180,352	01/30/01	Meade et al.			
	35E	6,177,250	01/23/01	Meade et al.			
	35F	5,466,589	11/14/95	Olinger et al.			
	35G	4,655,885	04/07/87	Hill et al.			
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**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub- class	Translation	
							Yes	No
	37A	WO 94/22889	10/13/94	WIPO				

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	38B	Ravi Rajagopalan et al., <i>Effect of Quaternization of the Glucose Oxidase "Wiring" Redox Polymer on the Maximum Current Densities of Glucose Electrodes</i> , The Journal of Physical Chemistry; 100(9); 3719-3727.
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Examiner		Date Considered

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